

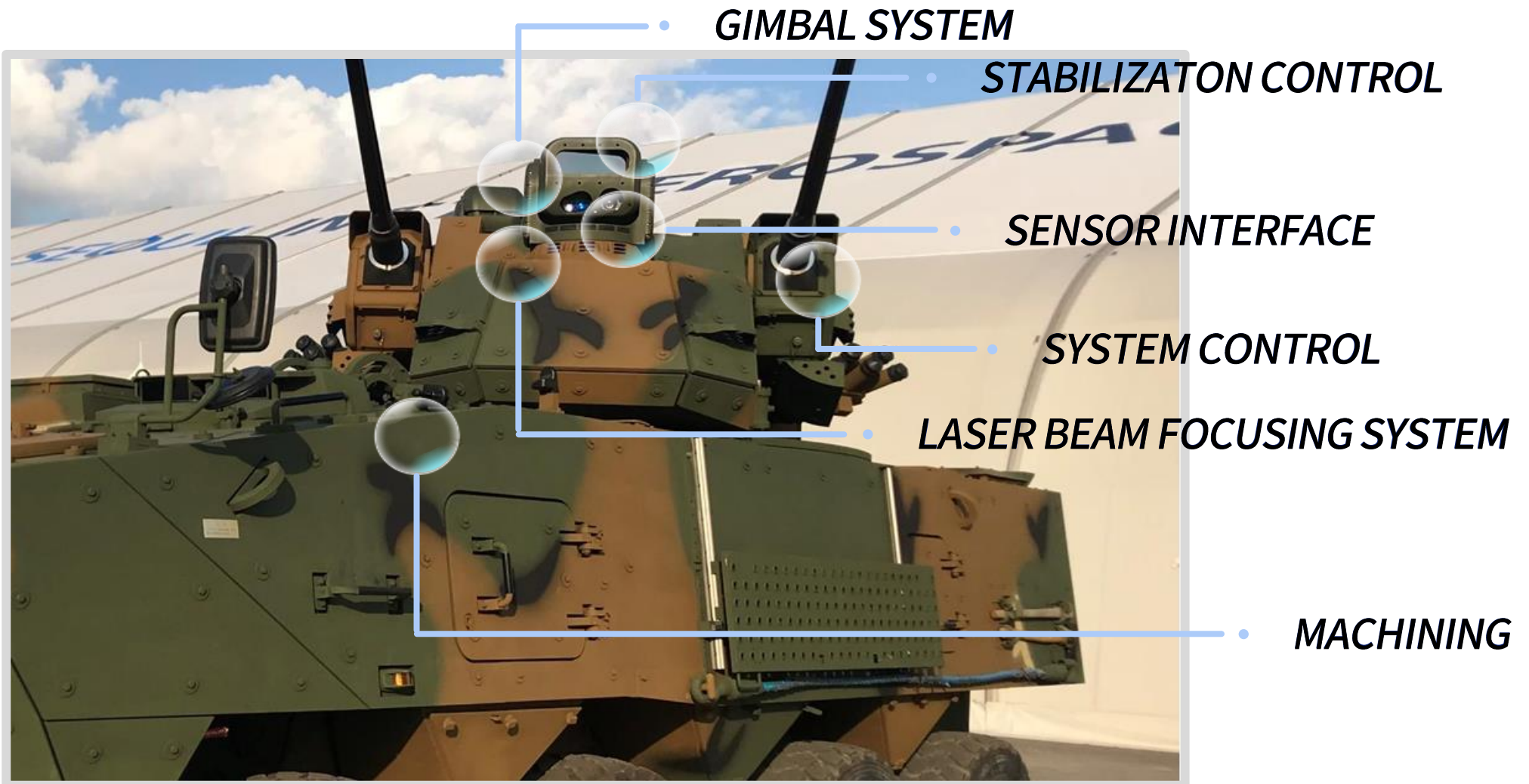
KIPCO
Radar & Electro Optic System





Owned products and solutions

ELECTRO OPTICS





Owned products and solutions

ELECTRO OPTICS

Wheeled anti-aircraft gun EOTS



Wheeled anti-aircraft gun EOTS

Summary

- Electro-optical tracker
- 360 degree omnidirectional surveillance and automatic target tracking
- Provides various target tracking and shooting specifications from small drones to high-speed fighters

Participation

- GIMBAL drive control assembly

Core Technology

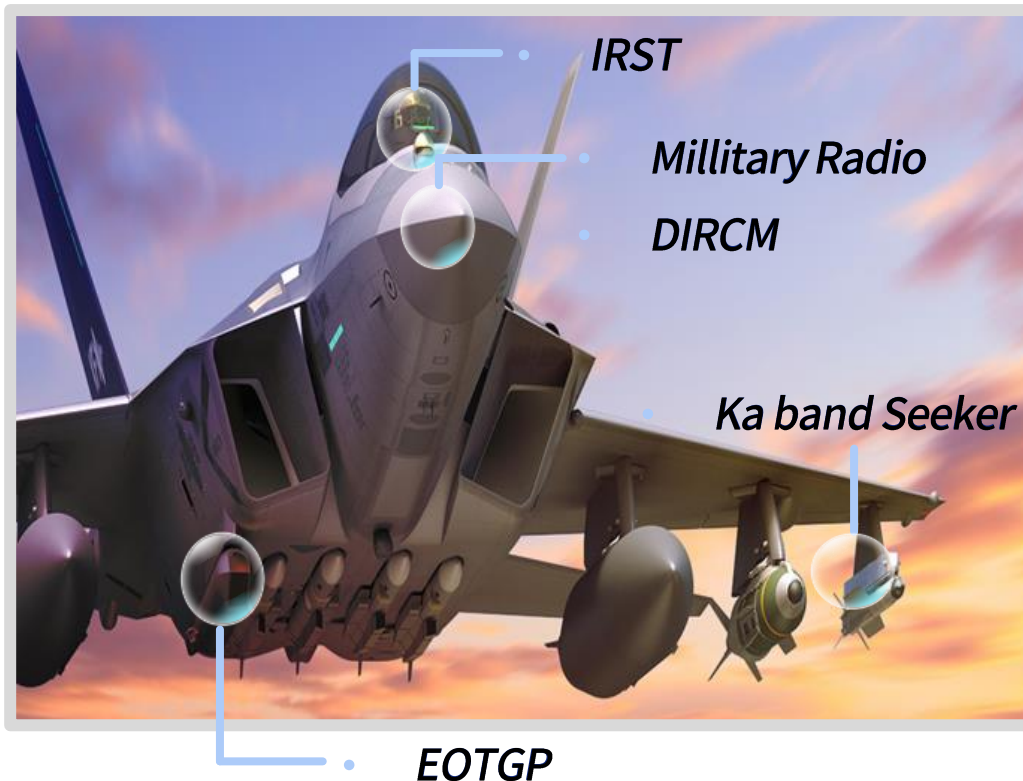
- Elevation / Azimuth 4-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- GIMBAL mechanism design and self-precision processing



Owned products and solutions

ELECTRO OPTICS

KF-X EOTGP



KF-X EOTGP

Summary

- Electro-optical target tracking device
- Detect and track targets day and night
- Precision armed guidance using laser

Participation

- Front integrated control assembly
- GIMBAL servo control assembly

Core Technology

- Elevation / Azimuth 4-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- GIMBAL mechanism design and self-precision processing
- Integrated control solution



Owned products and solutions

ELECTRO OPTICS

LAH TADS



Light Armed Helicopter(LAH) TADS

Summary

- Target acquisition indicator
- Day and night target image acquisition and tracking using visible light and infrared light
- Target distance measurement, guided missile guidance function and automatic tracking function

Participation

- GIMBAL servo control assembly
- System integrated control assembly

Core Technology

- Elevation / Azimuth 5-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- GIMBAL mechanism design and self-precision processing
- System integration



Owned products and solutions

ELECTRO OPTICS

Laser anti-aircraft weapon EOTS



laser anti-aircraft weapon EOTS

Summary

- Electro-optical tracker for precise targeting with laser at moving targets such as small unmanned aerial vehicles and multicopters at close range
- Application of high-repetition laser ranging technology for distance measurement of moving targets

Participation

- GIMBAL drive control assembly
- MWIR/SWIR drive control assembly
- telescope drive assembly

Core Technology

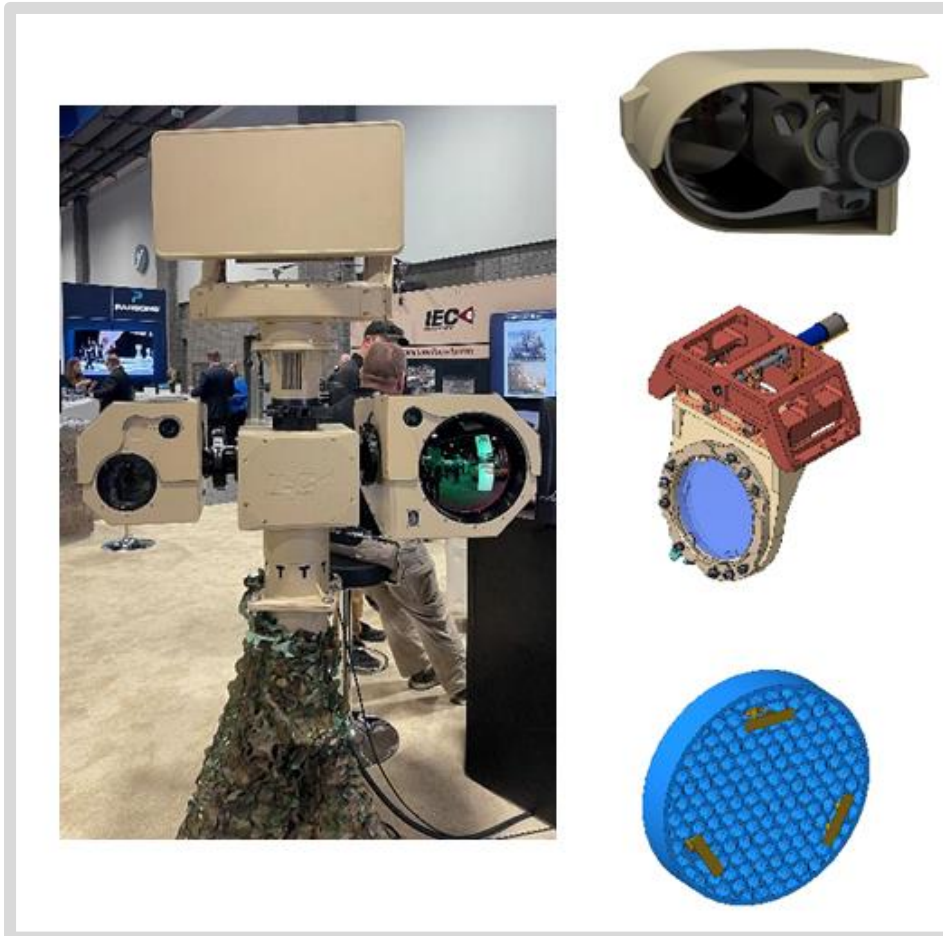
- Elevation / Azimuth 4-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- Camera driven stepper motor control
- GIMBAL mechanism design and self-precision processing



Owned products and solutions

ELECTRO OPTICS

Explosive Ordnance Disposal Device/
Laser Anti-Air Weapons



Laser Gun Beam Focusing

Summary

- An electro-optical tracker that precisely strikes moving targets such as small drones and multicopters with a laser at close range
- Application of high-repetition laser distance measurement technology for moving target distance measurement

Participation

- GIMBAL Drive Control Assembly
- MWIR/SWIR drive control assembly
- Telescopic drive assembly

Core Technology

- Elevation / Azimuth 4-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- Camera driving stepper motor control
- GIMBAL mechanism design and self-precision processing



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



mmWave multimode explorer

Summary

- Mounted on anti-ship ballistic missiles
- Detect maritime targets by operating both passive and active modes
- Maximize target high-speed detection and tracking performance by applying the latest active phased array antenna capable of electronic beam steering for compactness and light weight

Participation

- GIMBAL servo control unit
- KA band frequency synthesizer
- Missile balloon

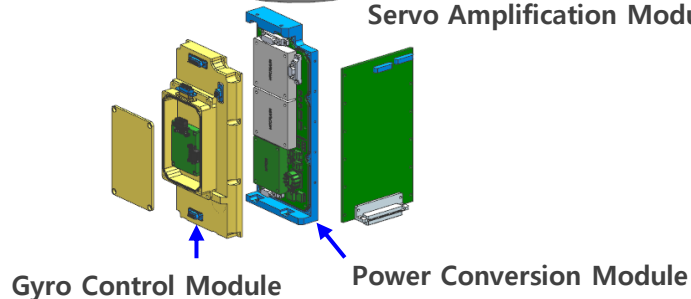
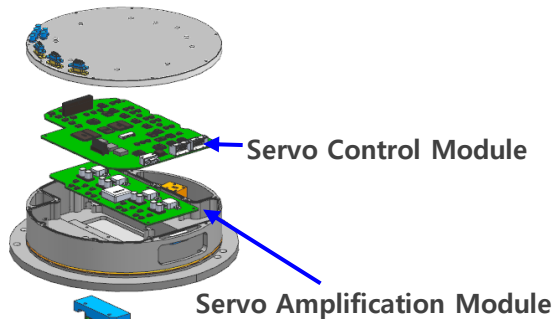
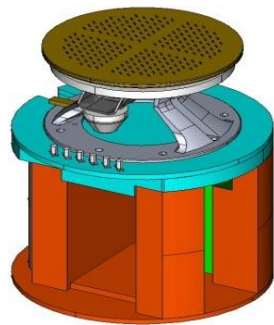
Core Technology

- Elevation / Azimuth 4-axis motor control
- Digital servo signal processing
- Stabilization control for target acquisition and tracking
- GIMBAL mechanism design and self-precision processing



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



KASA(KA Band RF Seeker)

- Kurz-Above band is the Frequency band of 26.5-40GHz

Main Function(KIPCO Development)

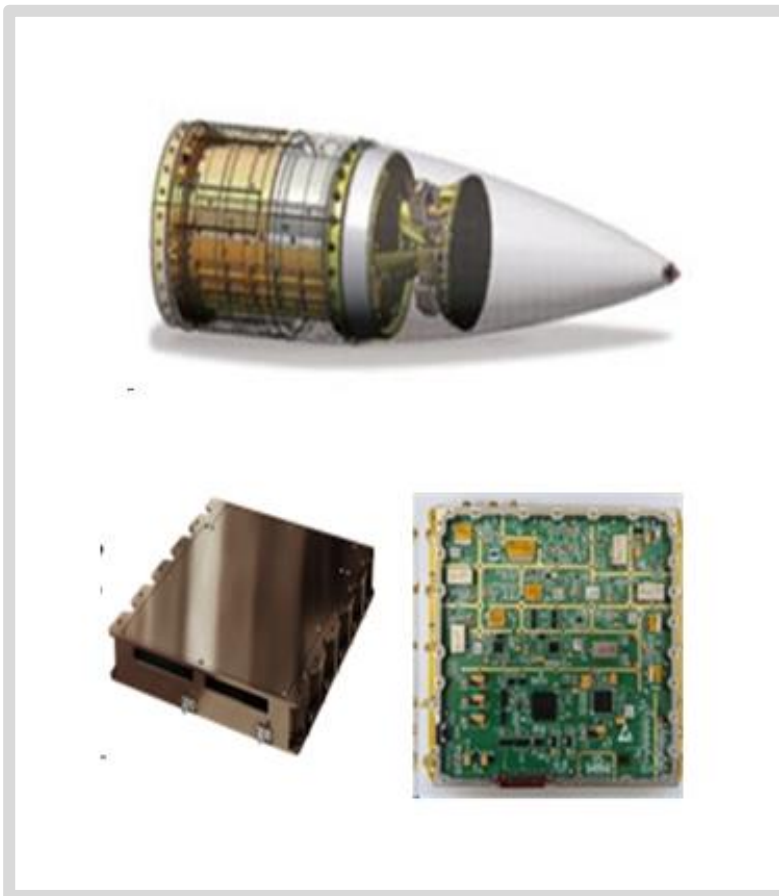
- Consists of Servo Control Module (SCM), Servo Amplification Module(SAM), Power Conversion Module(PCM)
- Control The Four AZ/EL 2-Axis DC Motor
- Interworking Gyro-Scorpe
- The Fuction of Resolver Interface (Using RDC)
- Digital Signal Processing Function based on DSP (TMS320F28335)
- Interworking Signal Processor : RS422 Commnication Interface
- Equip Circuit protecting from Overcurrent or Overvoltage



Owned products and solutions

ELECTRO OPTICS

KA BAND SEEKER



Ka band-frequency synthesizer

Ka band-frequency synthesizer

Summary

- Generates a stable reference signal even under the millimeter wave seeker operating environment and provides it to each component
- Provides various transmission waveforms, correction signals and BIT information required for operation

Core Technology

- Configured to select the required frequency by software within the Tunable PLDRO Bank
- Frequency boost function using a mixer
- Configuration of filter bank to remove interference and unwanted signals for each channel
- Configure the splitter to supply the usable frequency to the up/down converter
- It consists of a waveform signal switch unit, a variable reference signal frequency generator unit, and a microwave frequency generator unit.

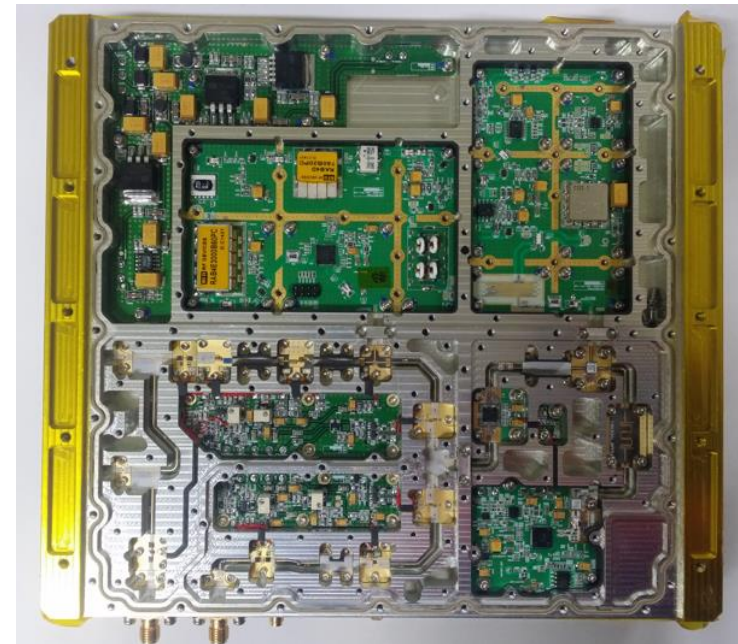
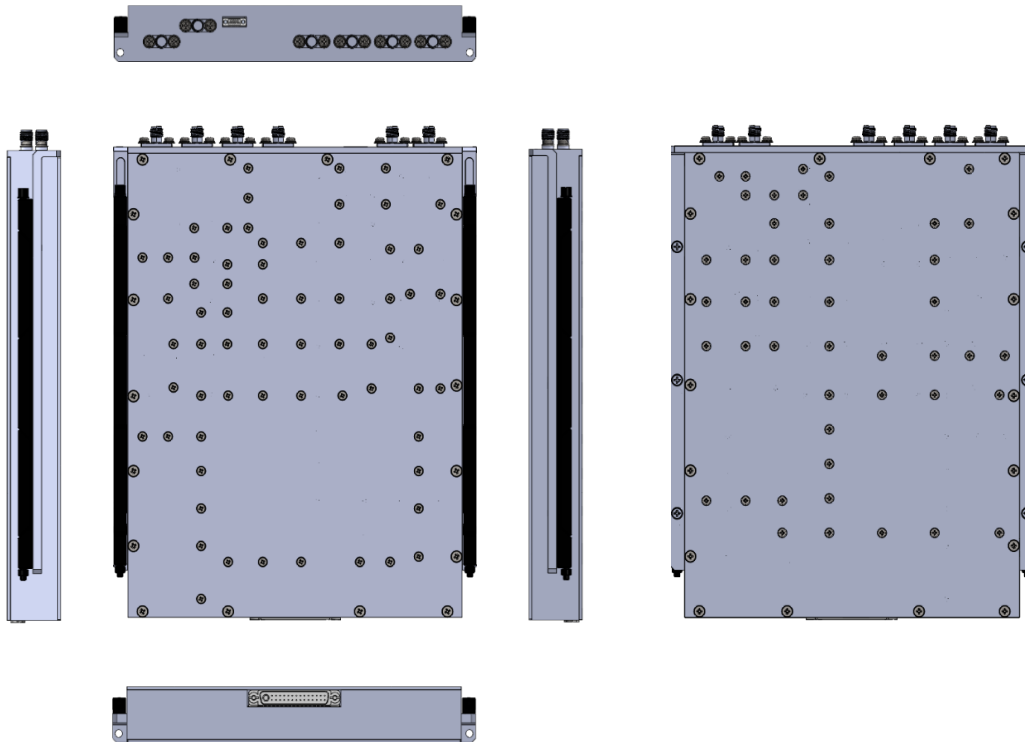


Owned products and solutions

ELECTRO OPTICS

KA BAND SEEKER

► Shape



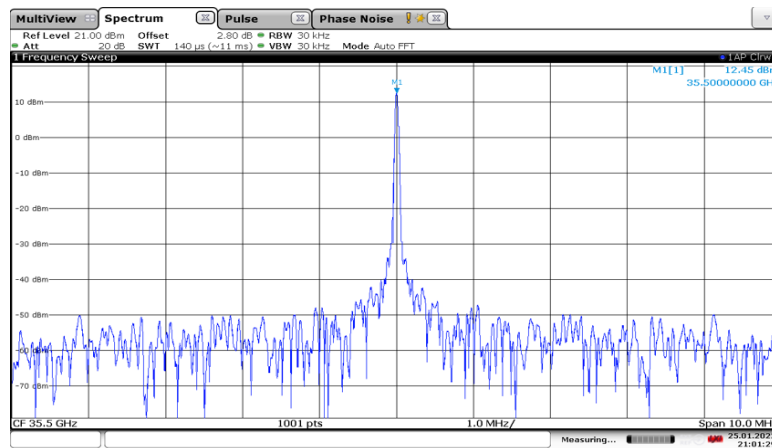
- Size: 220mm x 165mm x 26mm
- Estimated Weight: 1.95kg



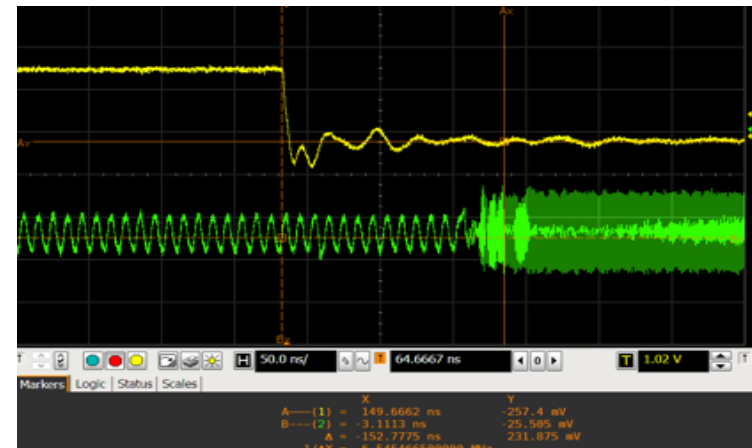
Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER

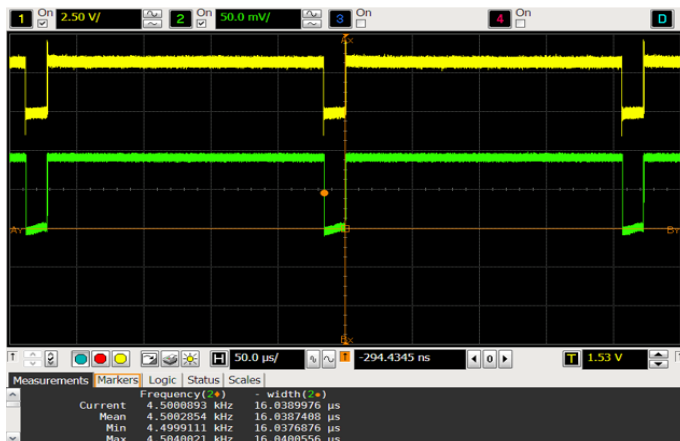
► Main Performance



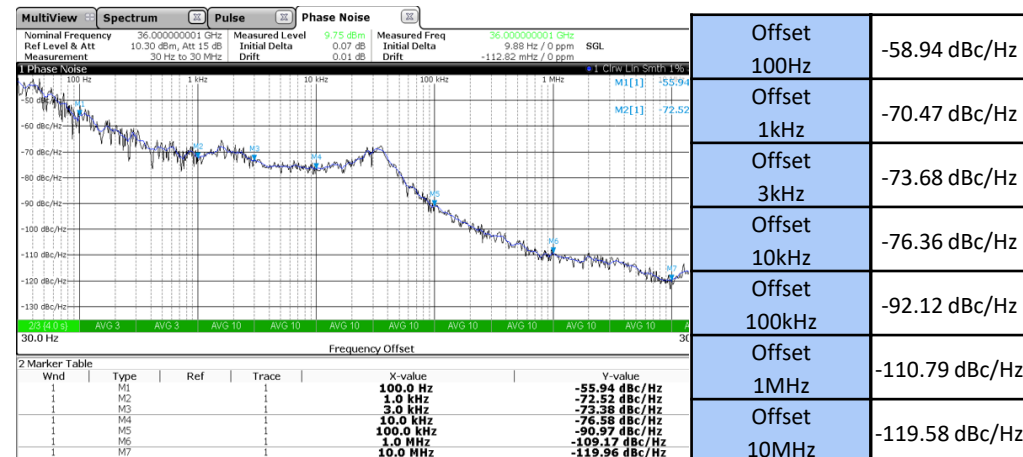
<KA_BAND output :12dBm>



<Frequency switching speed 150ns>



< PRF: Within 0.08Hz, PW:16ns>

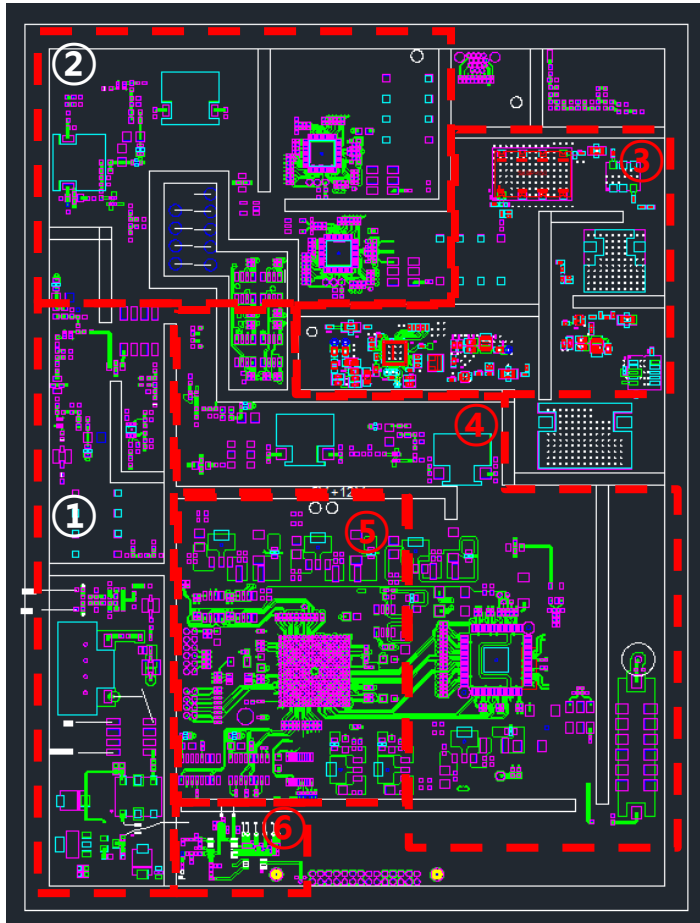


< 36 GHz phase noise>



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



➤ Top of the module

- ① Reference signal generation and distribution circuit
 - Generates a signal of xxMHz on TCXO (VT11M-H33-NNu50-V05GB-50MHzTeD)
 - The signal generated by the TCXO is transmitted to each frequency synthesizer component through a divider.

generated signal	Transmitted frequency synthesizer component
TCXO raw signal	2 output signals (Fcoho, CCO) and PLL REF Input signal
TCXO 5 TH Harmonic	FPGA CLK Input, DDS CLK Input signal

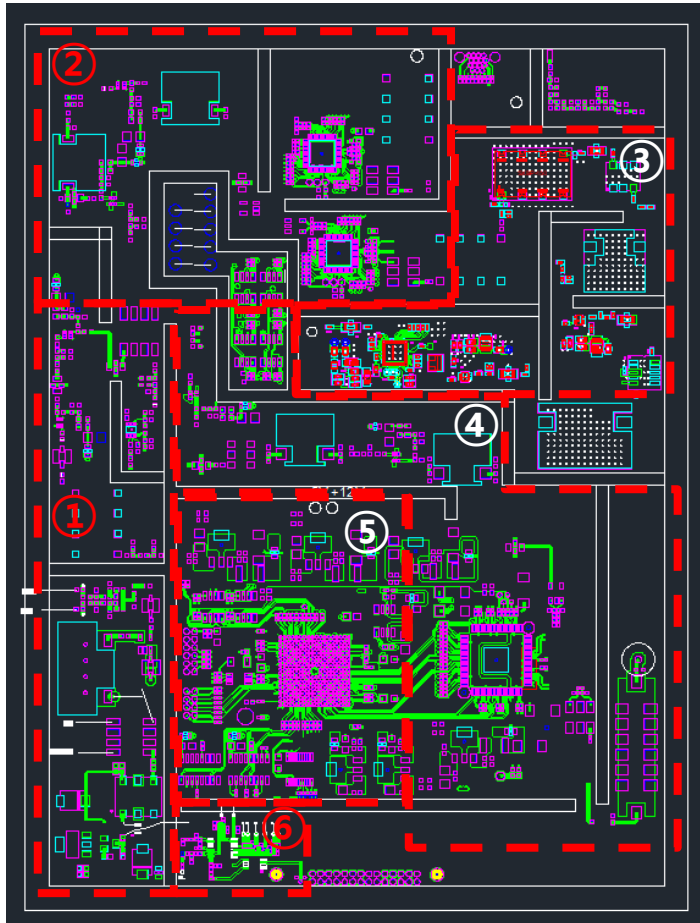
② DDS1,3 CLK Input Circuit

- The 5TH Harmonic signal of the reference signal generated from TCXO is multiplied by 2 and transmitted to the CLK Input signal of DDS1,3 (AD9958)
- The output signal of DDS1 is transmitted to the DDS1 RF circuit at the bottom of the module
- The output signal of DDS3 is transmitted to the DDS3 RF circuit at the top of the module.



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



➤ Top of the module

③ DDS3 RF Circuit

- The output signal of the DDS3 (AD9958) is multiplied by 8 through each multiplier and transmitted to the IF input signal of the mixer (HMC339) among the parts that make up the millimeter wave generator circuit at the bottom of the module

④ DDS2 CLK Input Circuit

- The 5TH Harmonic signal of the reference signal generated from the TCXO is multiplied by 4 and transmitted to the CLK Input signal of the DDS2 (AD9910)
- The output signal of DDS2 is transmitted to the DDS2 RF circuit at the bottom of the module

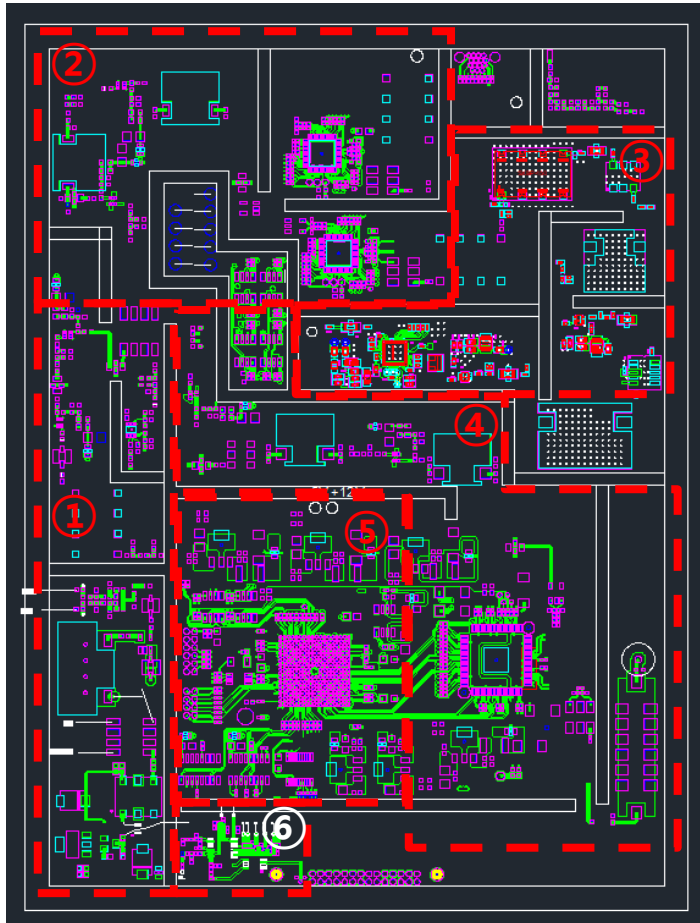
⑤ FPGACircuit

- The 5TH Harmonic signal of the reference signal generated from the TCXO is transferred to the CLK Input signal of the FPGA (XC7A75T-2FTG256I)
- Control each component of the frequency synthesizer



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



➤ Top of the module

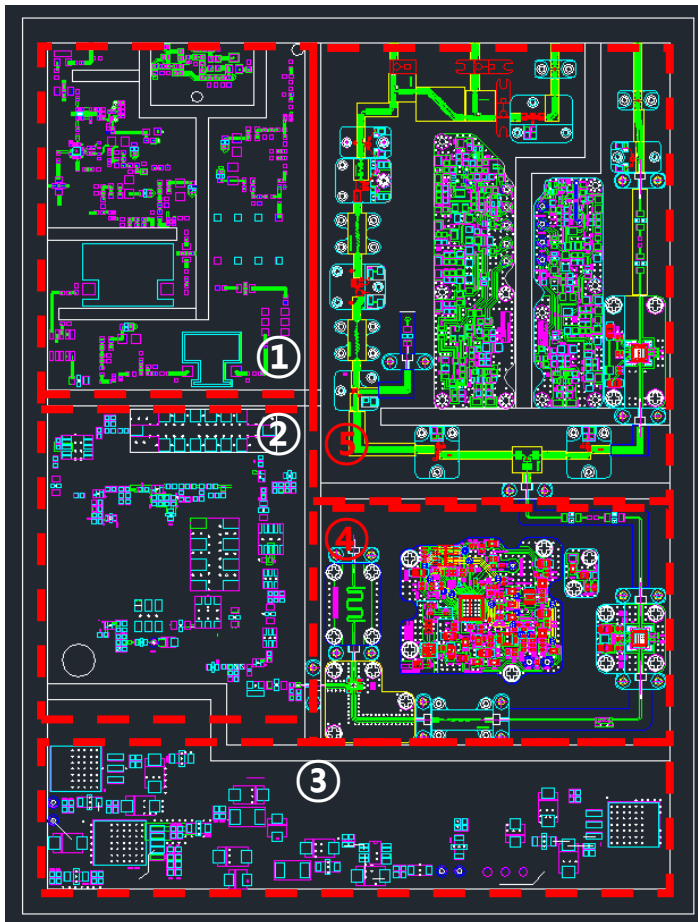
⑥ PLL Circuit

- Circuit for synchronizing the signal generated by the TCXO with an external signal
- The input signal received from the CCO port and the signal generated by the TCXO inside the frequency synthesis unit are compared through the PLL (ADF4002).
- Added SPDT (HMC349AMS8G, ADG849) at both ends of the PLL to use the CCO port, which was previously used for signal output, as an input/output port.



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



➤ Top bottom of module

① DDS1(AD9958) RF Circuit

- Direct digital frequency synthesizer (FLO2) signal output circuit
- The signal received from DDS1 (AD9958) at the top of the module is multiplied by 8 through each multiplier, and the signal is output to the outside of the module.

② DDS2(AD9910) RF Circuit

- The signal received from the DDS2 (AD9910) on the top of the module is multiplied by 8 through each multiplier and then input to the Mixer IF stage in the Ku Band circuit

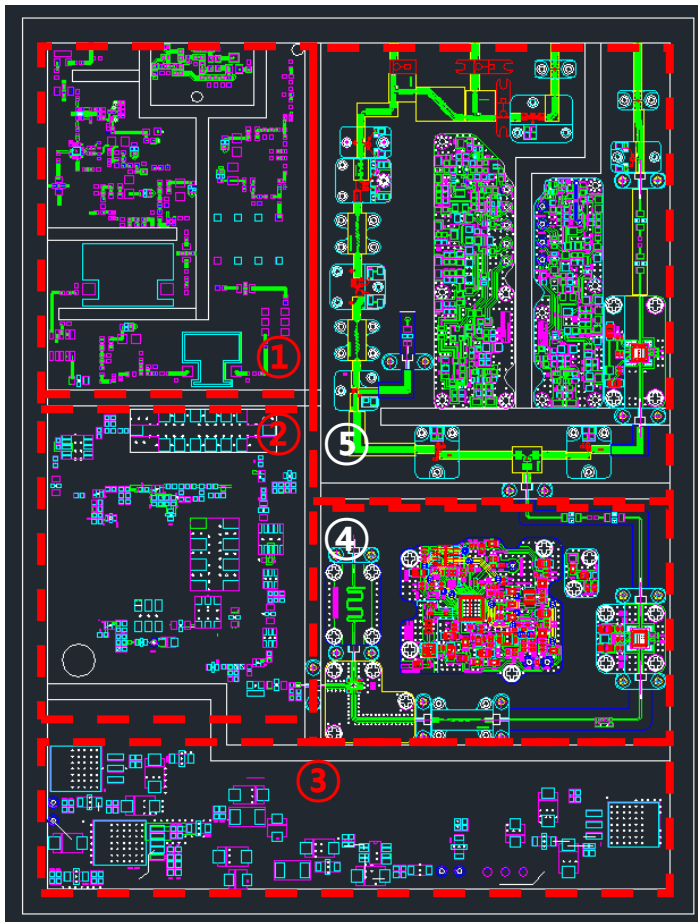
③ Circuit of power supply

- +6V, -6V, +15V power delivered from the top of the module is adjusted to +5V, -5V, +12V power through the regulator.



Owned products and solutions

ELECTRO OPTICS KA BAND SEEKER



➤ Top bottom of module

④ Ku Band Circuit

- Generates a signal of xxGHz through PLL (hmc807LP3E) from the signal received from TCXO (VT11M-H33-NNu50-V05GB-50MHzTeD) on top of the module
- Through the Mixer (HMC554ALC3B) in the circuit, the signal (LO) generated through the PLL and the signal (IF) multiplied by the DDS2 RF circuit are mixed and transmitted to the millimeter wave signal generator (FTX, FLO1)

⑤ Millimeter wave signal generator (FTX, FLO1)

- The signal received from the Ku Band circuit is distributed to the high-frequency transmitter assembly input signal (FTX) and the millimeter wave receiver assembly input signal (FLO1) through the two-branch divider, respectively.
- Through the MIXER (HMC339) in the FTX circuit, the signal (LO) distributed from the 2nd quarter divider and the signal (IF) received from the DDS3 (AD9958) RF circuit on the top of the module are mixed.
- The mixed signal is distributed to the input signal (FTX) of the high-frequency transmitter assembly, the signal for calibration of the receiver (Fpilot), and the reference signal (Ftce) for the searcher laboratory test through the last-stage directional coupler.



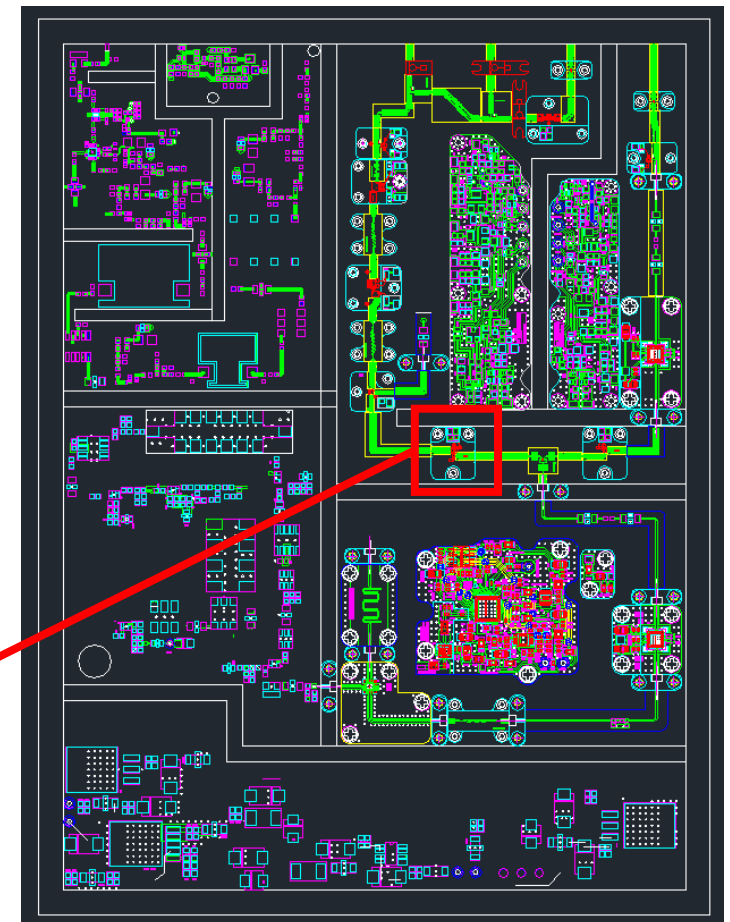
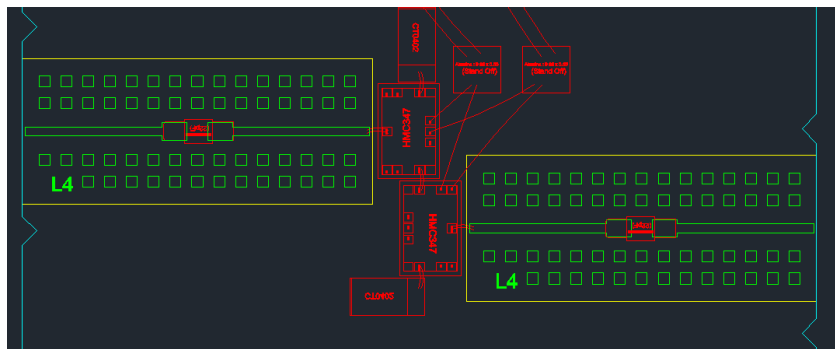
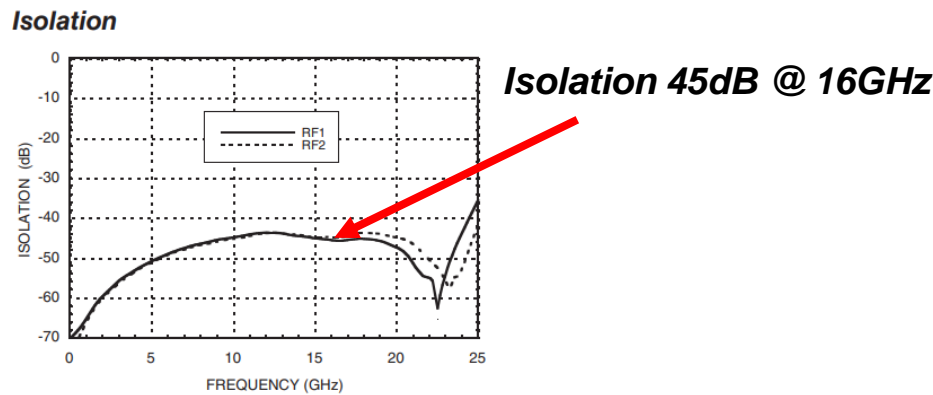
Owned products and solutions

ELECTRO OPTICS

KA BAND SEEKER

➤ **FTX Pulse On/Off Isolation: Over 70dB**

- ✓ Switch used (SPDT): HMC347
- Isolation: >40dB @ 20GHz
- Two-stage switch connection 40dB + 40dB = 80dB





Owned products and solutions

SATELLITE COMMUNICATION



- *PAT: High-speed laser communication between satellites*

- *integrated modem conversion and demodulation*

- *Laser dazzling for satellite monitoring*

- *Terrestrial terminal laser transceiver*

- *Multi-channel high-speed optical wavefront deforming mirror*



Owned products and solutions

SATELLITE COMMUNICATION

Laser communication



Space laser communication system

Summary

- Laser communication system using light wavelength in outer space
- 10 to 100 times faster than the existing microwave wireless communication method

Implementation plans

- Securing laser pulse modem technology
- Securing optical design technology
- Securing lens precision control and tracking technology
- Prototyping

Related business

- Space laser communication relay system for satellite
- Ground station laser communication relay system



Owned products and solutions

SATELLITE COMMUNICATION

High-speed light wavefront deformable mirror



High-speed light wavefront deformable mirror

Summary

- A key component of an adaptive optics system that compensates for optical performance degradation lost by atmospheric disturbances
- Core technologies applicable to military weapon systems such as long-distance threat monitoring equipment, laser weapon systems, and laser communication systems

Fields of Participation

- Motion control assembly

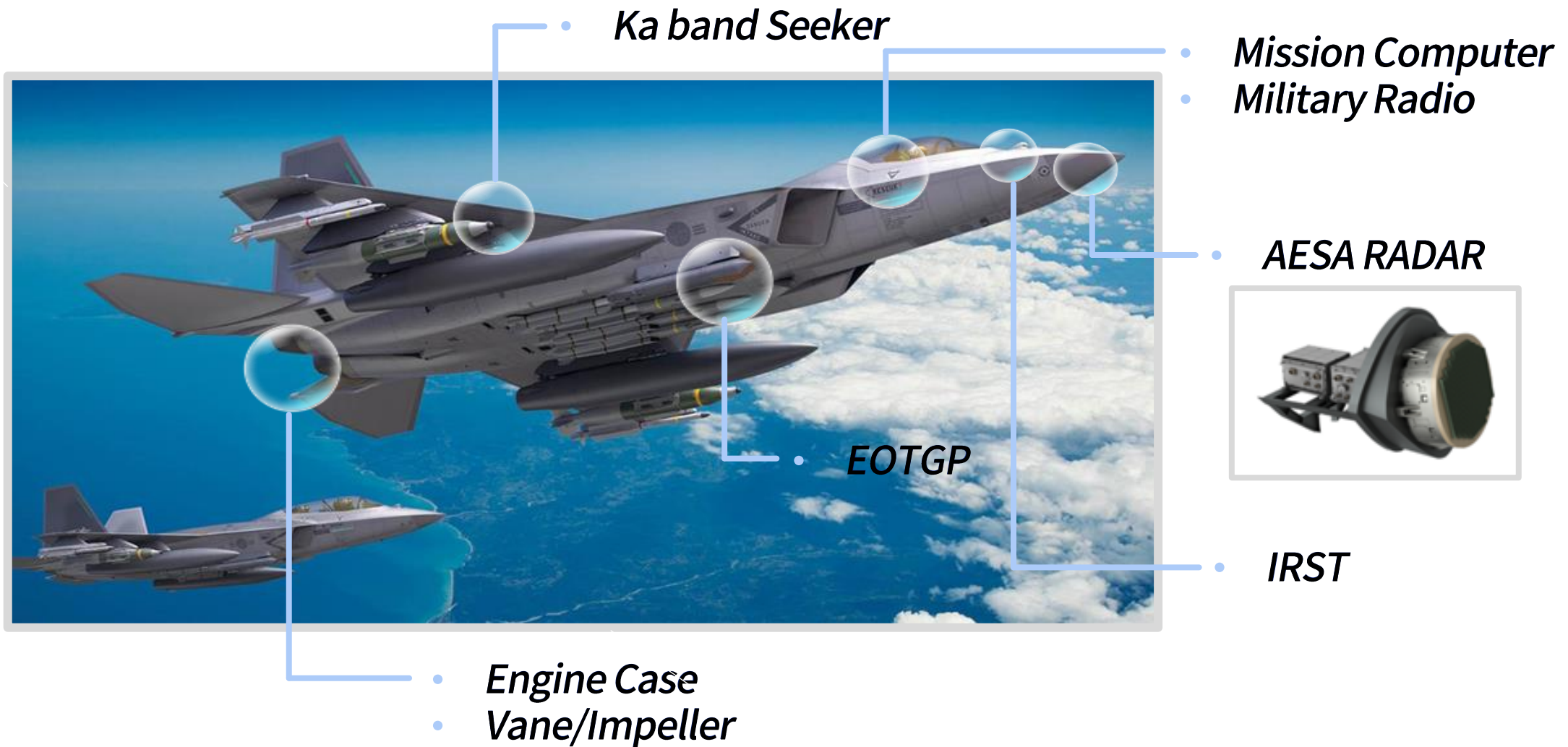
Technology

- Precision control of multiple drive units
- Digital signal processing



Owned products and solutions

Aerospace Defense Parts





Owned products and solutions

Aerospace Defense Parts

Aircraft parts



Titanium impeller

Aircraft engine parts

Summary

- High Efficiency Backward Lean Type Impeller Design
- Improved precision and durability through 5-axis machining
- A rotor used to increase or decrease the pressure and flow of a fluid

Participation

- Precision machining

Core Technology

- Difficult-to-cut materials, precision blade processing

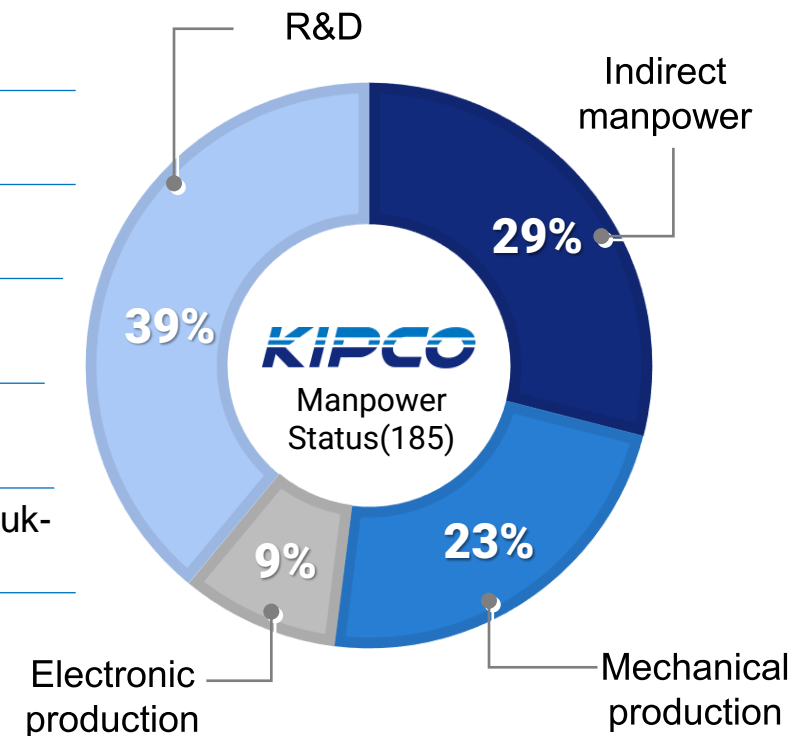


General Information

Company Overview

Radar & Electro Optic System Manufacturer in Aerospace & Defense Industry

Company	KIPCO RADAR & ELECTRO OPTIC SYSTEM
Establish	Mar 1989
CEO	Kyeong Ahn Chung
Main products	Radar, EOTS, Satellite/communication equipment
2022 Sales	35 Million
LABOR	185
Location	Changwon Plat : 43-2, Palyong-dong, Changwon-si, Gyeongsangnam-do
	Dongtan Plant : 847-2 Banggyo-ri, Dongtan-myeon, Hwaseong-si, Gyeonggi-do
	Gumi Plat: 217, 1gongdan-ro, Gumi-si, Gyeongsangbuk-do, Republic of Korea





General Information

Changwon Plant

Business Area	Machining of aviation and defense parts
Facilities	5 Axis Milling, Turning, CMM, Mechanical Cooling Lab
Equipment	ERP MES applied smart factory
Labor	Total 85, producers 40, production technology 15, quality control 15, production management 10, management support 4
Size	7934 sqm
etc	AS 9100 certified, specialized in TITANIUM machining
Location	43-2, Palyong-dong, Changwon-si, Gyeongsangnam-do
Contact	Tel: 055-251-9171, Fax: 055-251-9060, E-mail: kipco@kipcokorea.com



Changwon Plant



General Information

Dongtan Plant

Business Area	Radar/EOTS/satellite communications
Facilities	Radar Lab, EOTS Lab, Electronic Production Line, Machining Line
Equipment	3AXIS 5AXIS MCT, Thermal shock chamber
Labor	Total 100, producers 50, engineer 30
Size	5000 sqm
etc	AS 9100 certification, RF DIGITAL H/W S/W mechanism design
Location	847-2 Banggyo-ri, Dongtan-myeon, Hwaseong-si, Gyeonggi-do
Contact	Tel: 070-5038-3953, Fax: 070-8260-2760, E-mail: kipco@kipcokorea.com



Dongtan Plant



General Information

Gumi Plant (Scheduled for April)

Business Area	Electronic optical equipment, MRO
Facilities	1000 CLASS CLEAN ROOM
Quaternion	Electro-optical production 7, production technology 2, quality control 2
Size	17,790 sqm
Location	230, Sanho-daero, Gumi-si, Gyeongsangbuk-do, Republic of Korea



1000 Class Clean Room



Gumi Plant